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A NEW SPECIES OF OLIVA FROM SANTO DOMINGO, WITH NOTES ON OTHER MARINE FORMS

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During the past summer (1937) a little over two months were spent along the northern coast of Santo Domingo. Though our interest was mainly devoted to a study of the land mollusks of this region, considerable time was spent at a limited number of marine stations. These places were located at Monte Cristi, Puerto Plata, Puerto Sosua and Santa Barbara de Samana.

The northern coast of Santo Domingo is exposed to the easterly trades and to the somewhat frequent winter storms from the north. In addition, deep water prevails along this entire coast with a consequent lack of protection from strong wave action. A few little harbors exist, and these possess only small areas that are sheltered during any severe blow. As a consequence, the marine fauna is limited throughout most of this area. Protected places, however, in the lee of points of land, or little coves in the harbors yielded a large number of species.

The region at Monte Cristi is thus favored by a small peninsula and a six-mile stretch of coast line that runs north and south, forming a fairly large bay, which is somewhat protected from the trade winds. Shallow water extends from the end of the peninsula completely around the bay, broadening to about three miles near the center. The beach is astonishingly rich in drift material which would indicate exceedingly favorable offshore conditions.

From "El Morro" at Monte Cristi east to Old Cape Frances, the coast is mainly rocky and composed of the "diente de perro" limestone, forming cliffs in some places 20 to 50 feet high. Small beaches are to be found at irregular intervals along this section of the coast with a fairly long stretch some 20 miles east of Puerto Sosua. Easterly, beyond Old Cape Frances, the coast is mainly

sandy, giving way to rock again towards the tip of the Samana peninsula. We found the few outer beaches investigated along this northern coast to be exceedingly poor in material. The ricks of shells were thin, scattered, and composed generally of fragments of the rock-inhabiting species.

The harbors at Puerto Plata and Puerto Sosua are small and have but limited protected areas; these proved, however, to be quite rich. The inner portions of both are margined by sandy beaches, the sides by weathered limestone. A small coral reef is located in the center of Puerto Sosua harbor, the bottom elsewhere being composed mainly of sand. The bottom of Puerto Plata harbor is mainly a bluish clay. At the time of our visit, a suction dredge which was operating, enabled us to obtain many more species from this locality.

Santa Barbara de Samana is a small village located on the south side of the Samana peninsula and about five miles from the entrance of Samana Bay. Conditions here for most forms of marine life are ideal. Three small keys protect the little harbor and offer in addition to the mainland a remarkable series of habitat stations. A small stream empties into the harbor on the western end of the village, and it has created a fairly extensive sand bar which proved to be exceedingly rich in bivalves. Both east and west of the settlement are several spurs from the main mountain ridge which composes the peninsula. These project into the bay, forming points between which are small bays with sandy or shingle beaches.

Samana Bay proper is a deep reach of water, approximately 25 miles long and about 9 miles wide. The inner or western end of the bay is brackish and muddy, due to the silt brought down by the Rio Yuna which empties into the bay at this point. The easterly trade winds in addition cause the plant debris to drift to this end of the bay, which is there impounded along with the silt to form the shore. This western shore is advancing rather rapidly, to judge by the conditions noted and the statements of many of the inhabitants. Gabb's map indicates about a four-mile advance since 1873, and one resident told us of a saw-mill which formerly existed on the shore, receiving the saw logs at tide water, the foundations of which are now more than a mile inland.

We are deeply indebted to His Excellency Presidente Rafeal Leonidas Trujillo for every kindness and courtesy that could be extended to us. Without his aid much would have been left undone. Through his officers, Colonel Charles McLaughlin and Mr. Harry Hurst, a host of favors were granted that enabled us to see and visit many localities otherwise inaccessible. Their friendship and their interest in our work became invaluable. To Mr. and Mrs. C. L. Bennett, the resident manager and his wife of the United Fruit Company Plantations at Puerto Sosua, we are more than grateful for a real home during our month's residence at this place and for an unlimited number of kindnesses during our stay.

Our visit at Santa Barbara de Samana was made far more productive through the kindness of Señor Fortunato Beretta, who not only made arrangements for our several local trips but became a charming friend and companion during our all-too-short three weeks at this beautiful spot.

Our party consisted of Mr. Henry D. Russell, Mr. Richard A. McLean and the writer. The trip was made possible by a grant from the Milton Fund of Harvard University and the generosity of several friends of the Museum.

The following notes are based on certain of the material that seems worthy of immediate record. The marine collections as a whole are to be considered at a later date in a review of what is hoped to be a more or less complete study of the entire West Indian region.

We take pleasure in naming the following *Oliva* after President Trujillo:

OLIVA TRUJILLOI, new species. Plate 9, figs. 3-5. *Description*.—Shell solid, rather heavy, polished, with the greatest width just above the mid region. Ground color somewhat grayish, to reddish-brown, overlaid with fine and numerous reddish brown checks, intensified above and below the mid area to indicate two somewhat obscure bands. The general appearance of the shell is a decided reddish brown, a few specimens only retaining a grayish cast. Whorls 7 to $7\frac{1}{2}$. Spire short, descending *slightly* to the sixth whorl, the last whorl being formed along the margin of the preceding whorl. Parietal wall thinly glazed with fairly strong basal plications. Mid-parietal plications fairly strong,

short and developed to near the superior portion of the aperture. Aperture long and narrow, flaring slightly at the base. Palatal lip thick. Sculpture of only exceedingly fine growth lines. Suture deeply channeled. Interior of aperture a flat white.

Length	40.2	Width	16.3	Aperture	36.8 × 2.8 mm.	Holotype.
	40.4		16.9		35.5 × 3.0	Paratype.
	37.6		17.0		33.9 × 2.8	“
	35.1		15.0		30.0 × 2.0	“

Holotype.—Mus. Comp. Zoöl. no. 57240, Puerto Plata, Santo Domingo. Clench, Russell, McLean and Hurst, collectors, July, 1937. Dredged at about 5 fathoms. Many paratypes from the same locality. Additional records from Ponce, Puerto Rico, and Bay of Santiago, Cuba.

Remarks.—This species appears to be rather distinctive and rather remarkable because of its peculiar color, a color rarely equalled or approximated in this variable family. Morphologically it appears to be nearest to *O. sayana* (*O. litterata* auct., non Lamarck) but differs in color, much smaller size, the deeply channeled suture and the reduced spire.

The only species with which it can at all be confused is *O. caribaeensis* Dall, originally described from Mayaguez Harbor, Puerto Rico. It differs from this species in its reddish-brown coloration, the development of the last whorl, which in *O. caribaeensis* is descending, and in lacking the purplish coloration within the aperture which is described for this latter species. The proportions of the shell are slightly different, this new form being somewhat slenderer. Two specimens of *O. caribaeensis* Dall (Bull. United States Fish Commission (1900), 1, p. 391, pl. 56, fig. 9, 1901) were found occurring with *O. trujilloi* at Ponce, Puerto Rico, in the dredgings from the harbor obtained at approximately 30 feet.

O. caribaeensis appears to be more nearly allied to *O. reticularis* Lam. rather than to *O. sayana* as stated by Dall. *O. reticularis* was quite abundant at Puerto Plata in the dredgings, though it did not occur in our material collected at Ponce, Puerto Rico. At both stations it had a decided reddish cast.

PHALIMUM ERINACEUM VIBEX Linné.—In a previous paper¹ ref-

¹ 1937. Proc. New England Zoological Club, 16, p. 60.

erence was made to this species as one of the few definitely known to occur in both the tropical Atlantic and the Indo-Pacific region. A single specimen of this rare form was found alive at Puerto Sosua among the loose rocks in a protected cove.

SANGUINOLARIA SANGUINOLENTA Gmel.—This appears to be an exceedingly rare West Indian bivalve. We found it at Santa Barbara de Samana in a small protected cove one half mile west of the village on a sand bottom in from 1 to 2 feet of water. Live shells were rare; dead single valves, however, formed a conspicuous element in the drift at high water line.

LITORINA MINIMA (Wood).—(*Turbo minima* Wood 1828, Index Test. Suppl. pl. 6, fig. 9). *New records*.—Puerto Sosua; El Canal, Cabo Macoris, 6 miles N. E. of Puerto Sosua; Punta Chiva, 7 mi. E. of Santa Barbara de Samana. This supposedly rare West Indian species turned up in considerable numbers from Puerto Sosua east to Cape Samana. It frequents the "splash pools" that are found in the coastal limestone from high tide line to 6 or 7 feet above.

L. minima is closely allied to *L. mespillum* (v. Muhlf.), this latter species being a deep reddish brown to a blackish brown, *minima* differing in possessing a peculiar spotting with black dots over the entire surface of the shell. The description of *minima* indicates only a grayish white ground color with black dots. In our present series, however, the shells are nearly all yellowish-brown, a limited number of the grayish shells were found only at Puerto Sosua. *L. mespillum*, though far more widespread, would appear to be a variety of *L. minima*.

Dall and Simpson do not list this species in their "Mollusca of Porto Rico" but inasmuch as they list "San Juan (Gundlach)" as the only locality for *Litorina mespillum*, a very widely distributed species in the West Indies, occurring only in the splash pool habitat, it is quite possible that it was overlooked. Dr. Aguayo reports only eight known specimens of *L. minima* from Cuba, though it is to be understood that little or nothing is known relative to the marine mollusks of the extreme eastern end of the island.

Litorina minima did not occur in the northern Bahamas where these splash pools were investigated nor did we encounter it at

Cienfuegos and the Guantanamo Naval Base, both on the south coast of Cuba, where the same habitats were carefully searched.

TEREBRA FLAMMEA Lamarck, Plate 9, figs. 1, 2. (*Terebra flammea* Lamarck 1822, An. s. Vert. 7, p. 284). This species was probably our most noted "find" in Santo Domingo. To judge entirely by the few specimens in our American museums, it is a very rare form, and has heretofore been reported only from the western Pacific. Our present new series establishes this as the first West Indian record. Some twenty specimens were found, both by ourselves and Mr. Harry Hurst, in the dredgings from Puerto Plata Harbor at depths of approximately 30 feet.

We possessed but a single specimen with the data as "China" (M. C. Z. no. 74746) and Dr. Pilsbry kindly loaned us the only two specimens possessed by him, which were also localized as China and originally received from H. Cuming through Dr. T. B. Wilson (A.N.S.P. no. 33,512). A careful comparison between the three western Pacific specimens and our present Santo Domingo series fails to disclose any differentiating characters, other than a little more diffusion of the brownish-orange spots on the Pacific forms (plate 9, fig. 1).

All of our present series were collected dead, though most of them are in perfect shape and possess strong color markings.

Known part		Spire portion lost (calculated)		Locality
Length	Whorls	Length	Whorls	
46 mm.	19	2.5 mm.	4	Puerto Plata
121	22	7	9	" "
120	16	16	15	China (A.N.S.P.)
125	22	6	8	" "

Many other species that we collected are still too imperfectly known relative to their distribution to be considered in these notes, though mention might be made of *Trigoniocardia ceramidum* Dall which we found quite abundant at Puerto Plata, and Monte Cristi, Santo Domingo, as well as Ponce, Puerto Rico. We failed to find it in the northern Bahamas, a region very rich in the Cardiidae.